

REMARKS

This Response is submitted in reply to the non-final office action mailed October 31, 2007. Claims 8-14 are pending in this application.

Rejections under 35 U.S.C. 103

Claims 8-14 stand rejected under 35 U.S.C. 103(a) as obvious over JP-2001-001645 (Tonoï et al.) in view of U.S. Patent Pub. 2003/0166467 (Azuma) and U.S. Patent Pub. 2004/0171485 (Nagai) and further in view of U.S. Patent 5,547,500 (Tsutsui). Applicants respectfully disagree. Neither Tonoï nor any of the other cited references discloses or suggest that the absorption peak wavelength of the light-to-heat transforming material is a longest wavelength at a layer formed nearest the supporting substrate, and decreases in wavelength as the layer is closer to the surface layer, as claimed. In the Office Action, the Examiner asserts that Tonoï teaches in paragraphs [0040] and [0033] that the recording layer formed closest to the substrate absorbs at the longest wavelength and subsequently formed layers absorb at shorter wavelengths. However, this is incorrect. Example 1 in Tonoï shows that the red layer closest to the substrate absorbs at 830 nm, the next blue layer absorbs at 655 nm, and the final green layer absorbs at 780 nm. See paragraphs [0035] and [0036]. Thus, the outermost layer in Tonoï has a longer absorption wavelength than the middle layer. Nowhere else does Tonoï teach or suggest the claimed arrangement of the absorption wavelengths of the light-to-heat transforming materials. Thus, even when combined with the other references, Tonoï does not teach or suggest all the limitations of independent claims 8, 13, and 14.

Further, the claimed materials and processes show unexpected results over the prior art. As shown in the present application, when a recording layer containing a light-to-heat transforming material having a longer wavelength of absorption peak is stacked on a recording layer containing a light-to-heat transforming material having a shorter wavelength of absorption peak (such as the green and blue layers shown in Tonoï), a desired recording layer cannot be solely colored, causing fogging. See paragraph [0094]. Compare the results shown in the present application in Example 2 and Comparative Example 2. Comparative Example 2 provides a recording medium wherein the recording layer formed closest to the substrate absorbs at the shortest wavelength and subsequently formed layers absorb at longer wavelengths. In contrast, the recording medium of Example 1 follows the claimed arrangement wherein the recording

layer formed closest to the substrate absorbs at the longest wavelength and subsequently formed layers absorb at shorter wavelengths. In the recording medium in Comparative Example 2, the second and third recording layers 22, 23 shown in FIG. 3 could not be individually colored, causing the color display to be unclear. See paragraph [0184]. In contrast, the recording medium of Example 2 resulted in sharp color tone and image. See paragraph [0181]. Thus, the ordering of the layers as provided in claims 8-14 provides superior results to those shown in the prior art.

Additionally, Tonoï does not teach or suggest a plurality of reversible thermal coloring compositions including light-to-heat transforming materials, as even admitted by the Examiner. See Office Action, p. 3. The reversible multicolor recording medium of claims 8-14 includes light-to-heat transforming materials which respectively absorb infrared rays to generate heat and are uniformly dispersed, respectively, in reversible thermal coloring compositions having different colors. In contrast, as discussed in Comparative Example 1 on page 25, line 12 of the specification, Tonoï discloses a recording medium in which separate recording layers and light-to-heat transforming layers are stacked on top of one another. One skilled in the art would have no reason to modify the separate recording and light-to-heat transforming layers in Tonoï with the combined layers shown in the other references. Tonoï shows a multicolor and multilayer recording medium, whereas Azuma, Nagai, and Tsutsui all show single color and single layer materials. None of the references shows the desirability of combining the coloring and light-to-heat transforming materials into a single layer. Thus, there would be no reason for one skilled in the art to combine Tonoï with Azuma, Nagai, or Tsutsui.

In addition to the structural differences discussed above, the claimed invention has several advantages over prior art materials. In the present reversible multicolor recording medium, reversible conversion of the recording layer between a colored state and a decolored state can be made, thus achieving sharp image display. In addition, after recording and erasing information repeatedly, image quality equivalent to the initial quality can be obtained on the recording medium. Further, by stacking the recording layers on one another on the supporting substrate so that the recording layer closer to the supporting substrate contains a light-to-heat transforming material having absorption at a longer wavelength, a high-quality image free from fogging can be recorded on the recording medium. See paragraphs [0195]-[0196].

For at least these reasons, claims 8-14 are not obvious over JP-2001-001645 (Tonoï et al.) in view of U.S. Patent Pub. 2003/0166467 (Azuma) and U.S. Patent Pub. 2004/0171485 (Nagai)

and further in view of U.S. Patent 5,547,500 (Tsutsui). Applicants request that the obviousness rejections be withdrawn.

Double Patenting

Claims 8-14 stand rejected on the ground of nonstatutory obvious-type double patenting as being unpatentable over claims 1-10 of U.S. Patent No. 6,995,116 in view of Tonoï. As noted above, Tonoï does not disclose or suggest that the absorption peak wavelength of the light-to-heat transforming material contained in the recording layers is a longest wavelength at a layer formed nearest the supporting substrate, and decreases in wavelength as the layer is closer to the surface layer in the stacked order. Applicants request that the double patenting rejections of claims 8-14 be withdrawn.


Claims 8 and 10-12 stand rejected on the ground of nonstatutory obvious-type double patenting as being unpatentable over claims 23-4 and 28-29 of copending application No. 10/565,918. A terminal disclaimer is submitted herewith to overcome this rejection.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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